

## Template and Checklist for a Superfund Groundwater Technical Impracticability Evaluation

### Purpose and Scope

The purpose of this *Template and Checklist for a Superfund Groundwater Technical Impracticability Evaluation* ["*Template and Checklist*"] is to facilitate the preparation and review of an evaluation of a technical impracticability (TI) waiver for groundwater at a National Priorities List site. The *Template and Checklist* is not meant to be a substitute for *Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration* [i.e., *TI Guidance*]<sup>1</sup>. Instead, the *Template and Checklist* is intended to ensure that the TI evaluation adheres closely to the 1993 *TI Guidance* by providing a list of the elements (taken from the 1993 *TI Guidance*) to be included in a TI evaluation to support the appropriateness of a TI waiver. This *Template and Checklist* also serves as an outline or template for a TI evaluation. A consistent format for each TI evaluation will allow reviewers to easily locate specific information provided. In addition to using this document, refer to the *TI Guidance* for key information concerning the decision framework and required documentation for a TI Waiver.

The inclusion of all of the checklist information in the TI evaluation does not ensure that the TI evaluation meets all of the necessary criteria for issuing a TI waiver. Furthermore, although the scope of the 1993 *TI Guidance* includes corrective action sites under the Resource Conservation and Recovery Act, EPA has not developed this *Checklist and Template* to be used for TI evaluations for RCRA sites.

### Length of TI Evaluation

To facilitate preparation and review, EPA recommends that the text of the TI evaluation, containing an evaluation of the information in the *Template and Checklist*, be a stand-alone document that is no longer than 100 pages. Additional supporting information may be provided in appendices.

### Use of the *Checklist*

<sup>1</sup>USEPA. 1993. *Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration*. Interim Final. Directive 9234.2-25.

The *Checklist* is found in Attachment 1. Each of the lettered and numbered sections in the *Checklist* correspond to sections from the *TI Guidance*, which are indicated in brackets. Each section contains a list of topics that also correspond to the *TI Guidance*. As appropriate, each of these topics are meant to be included in the TI evaluation. To confirm the inclusion of each topic, those preparing and reviewing a TI evaluation can check the checkboxes provided in the *Checklist* to indicate if the information is included in the TI evaluation. The applicable page number within the TI evaluation may also be included in the space provided to make it easier to find the information again.

DRAFT - Anaconda Yerington Mine Site

## ATTACHMENT 1

### TI EVALUATION CHECKLIST

#### I. Supporting Information for TI Evaluation [EPA 1993, 4.4]

##### A. Specific ARARs or Media Cleanup Standards [EPA 1993, 4.4.1]

- ☐ Identifies the specific COC ARARs to which the TI waiver would be sought. (TI Eval. pp.\_\_\_\_)
- ☐ Identifies the technical feasibility of restoring some of the groundwater contaminants. (TI Eval. pp.\_\_\_\_)
- ☐ Identifies potential benefits of attaining ARARs for some of the specific COCs. (TI Eval. pp.\_\_\_\_)

##### B. Spatial Extent of TI Decisions [EPA 1993, 4.4.2]

- ☐ Specifies the spatial distribution (vertical and horizontal) of subsurface contaminants in the unsaturated and saturated zones where the TI is sought (TI Eval. pp.\_\_\_\_)
- ☐ Identifies the spatial extent of the TI zone as early as possible in the process (TI Eval. pp.\_\_\_\_)
- ☐ Identifies the vertical limit of the TI zone in either absolute (e.g., mean sea level) or relative (e.g., aquifer system) terms (TI Eval. pp.\_\_\_\_)

##### C. Development and Purpose of the Site Conceptual Model [EPA 1993, 4.4.3]

###### 1. Background Information [EPA 1993, 4.4.3]

- ☐ Groundwater classification [cite?] (TI Eval. pp.\_\_\_\_)
- ☐ Location of potential environmental receptors (TI Eval. pp.\_\_\_\_)
- ☐ Nearby wellhead protection areas or sole-source aquifers (TI Eval. pp.\_\_\_\_)
- ☐ Location of water supply wells (TI Eval. pp.\_\_\_\_)

###### 2. Geologic and Hydrologic Information [EPA 1993, 4.4.3]

- ☐ Detailed description of regional and site geology (TI Eval. pp.\_\_\_\_)
- ☐ Physical properties of subsurface materials (TI Eval. pp.\_\_\_\_)
- ☐ Stratigraphy, including thickness, lateral extent, continuity of units, and presence of depositional features, such as channel deposits, that may provide preferential pathways for, or barriers to, contaminant transport. (TI Eval. pp.\_\_\_\_)
- ☐ Hydraulic gradients (horizontal and vertical). (TI Eval. pp.\_\_\_\_)

- ☐ Geologic structures or other subsurface features that may form preferential pathways for NAPL migration or zones of accumulation (TI Eval. pp.\_\_\_\_)
- ☐ If fractures or karst are present, secondary porosity considered (TI Eval. pp.\_\_\_\_)
- ☐ Hydraulic properties of subsurface materials (e.g., hydraulic conductivity, storage coefficient, effective porosity) and their directional variability (anisotropy). (TI Eval. pp.\_\_\_\_)
- ☐ Temporal variability in hydrologic conditions (TI Eval. pp.\_\_\_\_)
- ☐ Groundwater recharge and discharge information (TI Eval. pp.\_\_\_\_)
- ☐ Groundwater/surface water interactions (TI Eval. pp.\_\_\_\_)
- ☐ Characterization of secondary porosity features (e.g., fractures, karst features) to the extent practicable. (TI Eval. pp.\_\_\_\_)
- ☐ Depth to groundwater (TI Eval. pp.\_\_\_\_)

### **3. Contaminant Source and Release Information [EPA 1993, 4.4.3]**

- ☐ Location, nature, and history of previous contaminant releases or sources (TI Eval. pp.\_\_\_\_)
- ☐ Locations and characterizations of continuing releases or sources (TI Eval. pp.\_\_\_\_)
- ☐ Locations of subsurface sources (e.g., NAPLs). (TI Eval. pp.\_\_\_\_)

### **4. Contaminant Distribution, Transport, and Fate Parameters [EPA 1993, 4.4.3]**

- ☐ Temporal trends in contaminant concentrations in each phase (TI Eval. pp.\_\_\_\_)
- ☐ Estimates of subsurface contaminant mass (TI Eval. pp.\_\_\_\_)
- ☐ Phase distribution of each contaminant in the unsaturated and saturated zones (e.g., gaseous, aqueous, sorbed, free-phase NAPL, or residual NAPL) (TI Eval. pp.\_\_\_\_)
- ☐ Spatial distribution of subsurface contaminants in each phase in the unsaturated and saturated zones (TI Eval. pp.\_\_\_\_)
- ☐ Sorption information, including contaminant retardation factors (TI Eval. pp.\_\_\_\_)
- ☐ Contaminant transformation processes and rate estimates (TI Eval. pp.\_\_\_\_)
- ☐ Natural background levels, if applicable/appropriate (TI Eval. pp.\_\_\_\_)
- ☐ Contaminant migration rates based (TI Eval. pp.\_\_\_\_)
- ☐ Assessment of facilitated transport mechanisms (e.g., colloidal transport) (TI Eval. pp.\_\_\_\_)
- ☐ Properties of NAPLs that affect transport (e.g., composition, effective solubility, density, viscosity) (TI Eval. pp.\_\_\_\_)
- ☐ Anticipated impact of matrix/back diffusion (TI Eval. pp.\_\_\_\_)
- ☐ Geochemical characteristics of subsurface media that affect contaminant transport and fate (TI Eval. pp.\_\_\_\_)
- ☐ Other characteristics that affect distribution, transport, and fate (e.g., vapor transport properties). (TI Eval. pp.\_\_\_\_)

## D. Evaluation of Restoration Potential [EPA 1993, 4.4.4]

### 1. Source Control Measures [EPA 1993. 4.4.4.1]

- ☐ Demonstrates that contamination sources have been located and have been, or will be, removed, contained, or treated, to the extent practicable (TI Eval. pp.\_\_\_\_)
- ☐ Identifies of source materials (e.g., NAPL) that release significant quantities of dissolved contamination over the long-term to groundwater (TI Eval. pp.\_\_\_\_)

### 2. Remedial Action Performance Analysis [EPA 1993. 4.4.4.2]

- ☐ Demonstrates that the groundwater monitoring program within and outside the aqueous contaminant plume is of sufficient quality and detail to fully evaluate remedial action performance (e.g., to analyze plume migration or containment and identify concentration trends within the remediation zone). (TI Eval. pp.\_\_\_\_)
- ☐ Demonstrates that the existing remedy has been effectively operated and adequately maintained. (TI Eval. pp.\_\_\_\_)
- ☐ Describes and evaluates the effectiveness of any remedy modifications (whether variations in operation, physical changes, or augmentations to the system) designed to enhance its performance. (TI Eval. pp.\_\_\_\_)
- ☐ Evaluates trends in subsurface contaminant concentrations. Consider such factors as whether the aqueous plume has been contained, whether the areal extent of the plume is being reduced, and the rates of contaminant concentration decline and contaminant mass removal. Further considerations include whether aqueous-phase concentrations rebound when the system is shut down, whether dilution or other natural attenuation processes are responsible for observed trends, and whether contaminated soils on site are contaminating groundwater. (TI Eval. pp.\_\_\_\_)
- ☐ Identifies if treatability study performed (TI Eval. pp.\_\_\_\_)
- ☐ Analyzes performance of any ongoing or completed remedial actions, including:
  - ☐ Operational Information (TI Eval. pp.\_\_\_\_)
  - ☐ Enhancements to original remedy (including optimization efforts) (TI Eval. pp.\_\_\_\_)

### 3. Restoration Timeframe Analysis [EPA 1993. 4.4.4.3]

- ☐ Evaluates/Estimates timeframe for groundwater restoration. (TI Eval. pp.\_\_\_\_) [*Check guidance*]
- ☐ Documents predictive analyses of the timeframes to attain required cleanup levels using available technologies and approaches (TI Eval. pp.\_\_\_\_)

### 4. Other Applicable technologies [EPA 1993. 4.4.4.4]

- ☐ Conducted and documented a literature search to determine what cleanup approaches are possible based on the contaminants and geology at the site. (TI Eval. pp.\_\_\_\_)
- ☐ Lists technologies and approaches that were evaluated. (TI Eval. pp.\_\_\_\_)

- ☐ Summarized evaluation of alternatives. (TI Eval. pp.\_\_\_\_)
- ☐ Evaluated treatability study data (bench, pilot or full-scale) (TI Eval. pp.\_\_\_\_)
  - ☐ Provide study objectives (TI Eval. pp.\_\_\_\_)
  - ☐ Provide study results (TI Eval. pp.\_\_\_\_)
- ☐ Demonstrates that no other remedial technologies (conventional or innovative) could reliably, logically, or feasibly attain the cleanup levels at the site within a reasonable timeframe. (TI Eval. pp.\_\_\_\_)

E. Cost Estimates [EPA 1993, 4.4.5]

- ☐ Provides cost estimates for the remedial alternatives included in the Evaluation of Restoration Potential, including construction, operation and maintenance costs (TI Eval. pp.\_\_\_\_)
- ☐ Provides cost estimates for continued operation of existing remedy including operation and maintenance costs (if a remedy has been implemented) (TI Eval. pp.\_\_\_\_)
- ☐ Provides cost estimates for the proposed Alternative Remedial Strategy (ARS) (TI Eval. pp.\_\_\_\_)

F. Alternate Remedial Strategies (ARS) [EPA 1993, 5.0]

- ☐ Selects and summarizes an ARS that is technical practicable, protective of human health and the environment, and satisfies Superfund statutory and regulatory requirements [EPA 1993, 5.1] (TI Eval. pp.\_\_\_\_)
- ☐ Demonstrates that the ARS addresses exposure prevention [EPA 1993, 5.1.1] (TI Eval. pp.\_\_\_\_)
- ☐ Demonstrates that the ARS addresses source control and remediation prevention [EPA 1993, 5.1.2] (TI Eval. pp.\_\_\_\_)
- ☐ Demonstrates that the ARS addresses aqueous plume remediation prevention [EPA 1993, 5.1.3] (TI Eval. pp.\_\_\_\_)

G. Additional Remedy Selection Considerations [EPA 1993, 5.2.3]

- ☐ Aggressive action for shorter timeframes than other options (TI Eval. pp.\_\_\_\_)
- ☐ Shorter timeframe to reduce potential exposures (TI Eval. pp.\_\_\_\_)
- ☐ Shorter timeframe to reduce impacts to environmental receptors (TI Eval. pp.\_\_\_\_)

## Other

- ☐ Note any additional information or analyses considered for the TI evaluation other than as described above.